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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
STAICOVICI, STEFAN	

ART UNIT	PAPER NUMBER
1732	

DATE MAILED: 07/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/851,242	RUNKLE ET AL.	
	Examiner	Art Unit	
	Stefan Staicovici	1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1,2,4,5,16-19 and 21-27 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-2, 4-5, 16-19, 21-27 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 5/31/05.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Response to Reply Brief

1. Applicants' Reply Brief filed May 18, 2005 has been considered and entered.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on May 31, 2005 was filed after the mailing date of the Examiner's Answer on March 29, 2005. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Status of Application

3. In view of the Information Disclosure Statement filed on May 31, 2005, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 16 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 11-169676.

Regarding claim 1, JP 11-169676 teaches the claimed process of making a hollow fiber membrane separation device (contactor) including, wrapping a hollow fiber fabric onto a core (winding), potting the fabric and the core together to form an assembly (first potting), placing the assembly in a housing (shell), providing molds (14, 15), positioning the ends of the plurality of hollow fiber bundles into the molds and injecting a resinous material (thermosetting or thermoplastic material) into the mold to form an integrated structure with the housing (cartridge) (see paragraph [0026]).

In regard to claim 16, JP 11-169676 teaches a resinous material, hence teaching a thermoplastic or a thermosetting material.

Specifically regarding claim 19, JP 11-169676 teaches placing the assembly in a housing (shell) to form a hollow fiber membrane separation device (contactor). It is submitted that said assembly must be centered in order for the resulting hollow fiber membrane separation device (contactor) to function as described.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-169676 in view of Mancusi *et al.* (US Patent No. 5,186,832).

JP 11-169676 teaches the basic claimed process as described above.

Regarding claim 2, JP 11-169676 does not each bead potting. Mancusi *et al.* ('832) teach a process for making a hollow fiber membrane separation device (contactor) including, providing a core, wrapping a hollow fiber fabric onto said core (winding), potting the fabric and the core together to form an assembly (first potting), placing the assembly in a housing (shell) and potting the assembly and the housing interior to form a cartridge (second potting) (see col. 8, lines 44-48, col. 9, lines 1-7 and 60-68 and col. 9, lines 41-60). Further, it should be noted that Mancusi *et al.* ('832) specifically teach potting of the tube-sheets to the interior of the housing (see col. 9, lines 22-27). Furthermore, Mancusi *et al.* ('832) teach that the potting between the fabric and the core occurs by putting down continuous resinous potting material lines (bead-potting) (see col. 10, lines 45-50). Therefore, it would have been obvious for one of ordinary skill in the art to have used bead potting as taught by Mancusi *et al.* ('832) in the process of JP 11-169676 because, JP 11-169676 teaches a two potting process, whereas Mancusi *et al.* ('832) teach that in a two potting step process the first potting step is a bead potting step, hence providing for an

improved and, a more efficient, process and also because, both references teach similar processes and end-products.

8. Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-169676 in view of Caskey *et al.* (US Patent No. 4,961,760).

JP 11-169676 teaches the basic claimed process as described above.

Regarding claims 17-18, although JP 11-169676 teaches a resinous potting material, JP 11-169676 does not teach specific materials. Caskey *et al.* ('760) teach a process for making a hollow fiber membrane separation device (contactor) including, using a variety of materials as potting materials such as: epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic). Therefore, it would have been obvious for one of ordinary skill in the art to have used a variety of potting materials such as, epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) as taught by Caskey *et al.* ('760) in the process of JP 11-169676 because, JP 11-169676 specifically requires a resinous potting materials, whereas Caskey *et al.* ('760) teach that resinous materials such as epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) provide for an improved product and also because, all references teach a hollow fiber membrane separation device (contactor), hence a similar end-product that requires similar potting materials.

9. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-169676 in view of Bikson *et al.* (US Patent No. 4,800,019).

JP 11-169676 teaches the basic claimed process as described above.

Regarding claims 4-5, JP 11-169676 does not teach a heat-treating step, specifically a first and a second heat-treatment. Bikson *et al.* ('019) teach a process for forming a hollow fiber membrane contactor including, a first step of heat-treating to cure the potting resin and then a second step of heat treatment (see col. 4, line 60 through col. 5, line 7). Therefore, it would have been obvious for one of ordinary skill in the art to have heat-treated the hollow fiber membrane contactor as taught by Bikson *et al.* ('019) in the process of JP 11-169676 because, Bikson *et al.* ('019) specifically teach that a two-step heat treatment process provides for an increased density of the porous walls of the hollow fibers, hence providing for an improved product (see col. 3, lines 27-42) also because, both references teach similar end-products.

10. Claims 21, 24 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-169676 in view of Applicants' Admitted Prior Art.

JP 11-169676 teaches the basic claimed process as described above.

Regarding claim 21, JP 11-169676 does not teach a hollow fiber membrane having a diameter of at least 6 inches. However, Applicants' Admitted Prior Art teaches a hollow fiber membrane having a diameter of about 10 inches (see page 2, line 9 of the original disclosure). Therefore, it would have been obvious for one of ordinary skill in the art to have formed a hollow fiber membrane having a diameter of about 10 inches by using a center tube having a diameter of about 10 inches as taught by Applicants' Admitted Prior Art using the process of JP 11-169676 because, Applicants' Admitted Prior Art specifically teaches that such hollow fiber membrane are readily available whereas JP 11-169676 teach a hollow fiber membrane separation device (contactor), hence a similar end-product and also because JP 11-169676 teaches an efficient and simple process for making a hollow fiber membrane.

In regard to claim 24, JP 11-169676 teaches a resinous material, hence teaching a thermoplastic or a thermosetting material.

Specifically regarding claim 27, JP 11-169676 teaches placing the assembly in a housing (shell) to form a hollow fiber membrane separation device (contactor). It is submitted that said assembly must be centered in order for the resulting hollow fiber membrane separation device (contactor) to function as described.

11. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-169676 in view of Applicants' Admitted Prior Art and in further view of Bikson *et al.* (US Patent No. 4,800,019).

JP 11-169676 in view of Applicants' Admitted Prior Art teaches the basic claimed process as described above.

Regarding claims 22-23, JP 11-169676 in view of Applicants' Admitted Prior Art does not teach a heat-treating step, specifically a first and a second heat-treatment. Bikson *et al.* ('019) teach a process for forming a hollow fiber membrane contactor including, a first step of heat-treating to cure the potting resin and then a second step of heat treatment (see col. 4, line 60 through col. 5, line 7). Therefore, it would have been obvious for one of ordinary skill in the art to have heat-treated the hollow fiber membrane contactor as taught by Bikson *et al.* ('019) in the process of JP 11-169676 in view of Applicants' Admitted Prior Art because, Bikson *et al.* ('019) specifically teach that a two-step heat treatment process provides for an increased density of the porous walls of the hollow fibers, hence providing for an improved product (see col. 3, lines 27-42) also because, both references teach similar end-products.

12. Claims 25 and 26 rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-169676 in view of Applicants' Admitted Prior Art and in further view of Caskey *et al.* (US Patent No. 4,961,760).

JP 11-169676 in view of Applicants' Admitted Prior Art teaches the basic claimed process as described above.

Regarding claims 25-26, although JP 11-169676 teaches a resinous potting material, JP 11-169676 does not teach specific materials. Caskey *et al.* ('760) teach a process for making a hollow fiber membrane separation device (contactor) including, using a variety of materials as potting materials such as: epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic). Therefore, it would have been obvious for one of ordinary skill in the art to have used a variety of potting materials such as, epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) as taught by Caskey *et al.* ('760) in the process of JP 11-169676 in view of Applicants' Admitted Prior Art because, JP 11-169676 specifically requires a resinous potting materials, whereas Caskey *et al.* ('760) teach that resinous materials such as epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) provide for an improved product and also because, all references teach a hollow fiber membrane separation device (contactor), hence a similar end-product that requires similar potting materials.

13. Claims 1-2, 4-5 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mancusi *et al.* (US Patent No. 5,186,832) in view of Bikson *et al.* (US Patent No. 4,800,019).

Mancusi *et al.* ('832) teach the basic claimed process of making a hollow fiber membrane separation device (contactor) including, providing a core, wrapping a hollow fiber fabric onto

said core (winding), potting the fabric and the core together to form an assembly (first potting), placing the assembly in a housing (shell) and potting the assembly and the housing interior to form a cartridge (second potting) (see col. 8, lines 44-48, col. 9, lines 1-7 and 60-68 and col. 9, lines 41-60). Further, it should be noted that Mancusi *et al.* ('832) specifically teach potting of the tube-sheets to the interior of the housing (see col. 9, lines 22-27). Furthermore, Mancusi *et al.* ('832) teach that the potting between the fabric and the core occurs by putting down continuous resinous potting material lines (bead-potting) (see col. 10, lines 45-50).

Regarding claim 1, although Mancusi *et al.* ('832) teach a second potting step, Mancusi *et al.* ('832) do not specifically teach mold potting. Bikson *et al.* ('019) teach a process for forming a hollow fiber membrane contactor cartridge including, providing a mold, inserting the ends of a plurality of hollow fiber (3) bundles into the mold and injecting a resinous material into the mold to form tube-sheets (1) that are integral with the housing (see col. 4, lines 48-68). Therefore, it would have been obvious for one of ordinary skill in the art to have used mold potting as an alternative to gravity or centrifugal potting as taught by Bikson *et al.* ('019) in the process of Mancusi *et al.* ('832) because, Bikson *et al.* ('019) teach that mold potting is one of many equivalent procedures available to one ordinarily skilled in the art and also because, both references teach similar products and processes and solve the similar problem of potting in a process of making a hollow fiber membrane separation device (contactor). It is submitted that a space must exist between the exterior of the fiber bundles and, the mold and the housing, in order for the resin to penetrate between said spaces, such that mold potting occurs as described in the process of Mancusi *et al.* ('832) in view of Bikson *et al.* ('019).

In regard to claim 2, Mancusi *et al.* ('832) teach that the potting between the fabric and the core occurs by putting down continuous resinous potting material lines (bead-potting) (see col. 10, lines 45-50).

Specifically regarding claims 4 and 5, Mancusi *et al.* ('832) does not teach a step of heat-treatment, specifically a first and a second heat-treatment. Bikson *et al.* ('019) teach a process for forming a hollow fiber membrane contactor including, a first step of heat-treating to cure the potting resin and then a second step of heat treatment (see col. 4, line 60 through col. 5, line 7). Therefore, it would have been obvious for one of ordinary skill in the art to have heat-treated the hollow fiber membrane contactor as taught by Bikson *et al.* ('019) in the process of Mancusi *et al.* ('832) because, Bikson *et al.* ('019) specifically teach that a two-step heat treatment process provides for an increased density of the porous walls of the hollow fibers, hence providing for an improved product (see col. 3, lines 27-42) also because, both references teach similar end-products.

Regarding claim 19, Mancusi *et al.* ('832) specifically teach a hollow fiber membrane separation device (contactor). It is submitted that the assembly (structure) is centered in the housing (shell) in order for the resulting hollow fiber membrane separation device (contactor) to function as described.

14. Claims 1-2 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mancusi *et al.* (US Patent No. 5,186,832) in view of JP 11-169676.

Mancusi *et al.* ('832) teach the basic claimed process of making a hollow fiber membrane separation device (contactor) including, providing a core, wrapping a hollow fiber fabric onto said core (winding), potting the fabric and the core together to form an assembly (first potting),

placing the assembly in a housing (shell) and potting the assembly and the housing interior to form a cartridge (second potting) (see col. 8, lines 44-48, col. 9, lines 1-7 and 60-68 and col. 9, lines 41-60). Further, it should be noted that Mancusi *et al.* ('832) specifically teach potting of the tube-sheets to the interior of the housing (see col. 9, lines 22-27). Furthermore, Mancusi *et al.* ('832) teach that the potting between the fabric and the core occurs by putting down continuous resinous potting material lines (bead-potting) (see col. 10, lines 45-50).

Regarding claims 1-2, although Mancusi *et al.* ('832) teach a second potting step, Mancusi *et al.* ('832) do not specifically teach mold potting. JP 11-169676 teaches the claimed process of making a hollow fiber membrane separation device (contactor) including, wrapping a hollow fiber fabric onto a core (winding), potting the fabric and the core together to form an assembly (first potting), placing the assembly in a housing (shell), providing molds (14, 15), positioning the ends of the plurality of hollow fiber bundles into the molds and injecting a resinous material (thermosetting or thermoplastic material) into the mold to form an integrated structure with the housing (cartridge) (see paragraph [0026]). Therefore, it would have been obvious for one of ordinary skill in the art to have used mold potting as taught by JP 11-169676 in the process of Mancusi *et al.* ('832) because, JP 11-169676 specifically teach that mold potting is an efficient process for potting a hollow fiber membrane separation device, and also because, all references teach similar products and processes and solve the similar problem of potting in a process of making a hollow fiber membrane separation device (contactor). It is submitted that a space must exist between the exterior of the fiber bundles and, the mold and the housing, in order for the resin to penetrate between said spaces, such that mold potting occurs as described in the process of Mancusi *et al.* ('832) in view of by JP 11-169676.

In regard claim 19, Mancusi *et al.* ('832) specifically teach a hollow fiber membrane separation device (contactor). It is submitted that the assembly (structure) is centered in the housing (shell) in order for the resulting hollow fiber membrane separation device (contactor) to function as described.

15. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mancusi *et al.* (US Patent No. 5,186,832) in view of JP 11-169676 and in further view of Bikson *et al.* (US Patent No. 4,800,019).

Mancusi *et al.* ('832) in view of JP 11-169676 teach the basic claimed process as described above.

Regarding claims 4-5, Mancusi *et al.* ('832) in view of by JP 11-169676 does not teach a step of heat-treatment, specifically a first and a second heat-treatment. Bikson *et al.* ('019) teach a process for forming a hollow fiber membrane contactor including, a first step of heat-treating to cure the potting resin and then a second step of heat treatment (see col. 4, line 60 through col. 5, line 7). Therefore, it would have been obvious for one of ordinary skill in the art to have heat-treated the hollow fiber membrane contactor as taught by Bikson *et al.* ('019) in the process of Mancusi *et al.* ('832) in view of by JP 11-169676 because, Bikson *et al.* ('019) specifically teach that a two-step heat treatment process provides for an increased density of the porous walls of the hollow fibers, hence providing for an improved product (see col. 3, lines 27-42) also because, all references teach similar end-products.

16. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mancusi *et al.* (US Patent No. 5,186,832) in view of Bikson *et al.* (US Patent No. 4,800,019) and in further view of Caskey *et al.* (US Patent No. 4,961,760).

Mancusi *et al.* ('832) in view of Bikson *et al.* ('019) teach the basic claimed process as described above.

Regarding claims 16-18, although Mancusi *et al.* ('832) teach "resinous potting materials" (see col. 9, lines 10-12), Mancusi *et al.* in view of ('832) Bikson *et al.* ('019) do not teach specific materials. Caskey *et al.* ('760) teach a process for making a hollow fiber membrane separation device (contactor) including, using a variety of materials as potting materials such as: epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic). Therefore, it would have been obvious for one of ordinary skill in the art to have used a variety of potting materials such as, epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) as taught by Caskey *et al.* ('760) in the process of Mancusi *et al.* ('832) in view of Bikson *et al.* ('019) because, Mancusi *et al.* ('832) specifically requires "resinous potting materials" (see col. 9, lines 10-12) and also because all references teach a hollow fiber membrane separation device (contactor), hence a similar end-product.

17. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mancusi *et al.* (US Patent No. 5,186,832) in view of JP 11-169676 and in further view of Caskey *et al.* (US Patent No. 4,961,760).

Mancusi *et al.* ('832) in view of JP 11-169676 teach the basic claimed process as described above.

Regarding claims 16-18, although Mancusi *et al.* ('832) teach "resinous potting materials" (see col. 9, lines 10-12), Mancusi *et al.* in view of JP 11-169676 do not teach specific materials. Caskey *et al.* ('760) teach a process for making a hollow fiber membrane separation

device (contactor) including, using a variety of materials as potting materials such as: epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic). Therefore, it would have been obvious for one of ordinary skill in the art to have used a variety of potting materials such as, epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) as taught by Caskey *et al.* ('760) in the process of Mancusi *et al.* ('832) in view of JP 11-169676 because, Mancusi *et al.* ('832) specifically requires "resinous potting materials" (see col. 9, lines 10-12) and also because all references teach a hollow fiber membrane separation device (contactor), hence a similar end-product.

18. Claims 21 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mancusi *et al.* (US Patent No. 5,186,832) in view of JP 11-169676 and in further view of Applicants' Admitted Prior Art.

Mancusi *et al.* ('832) in view of JP 11-169676 teach the basic claimed process as described above.

Regarding claim 21, Mancusi *et al.* ('832) in view of JP 11-169676 does not teach a hollow fiber membrane having a diameter of at least 6 inches. However, Applicants' Admitted Prior Art teaches a hollow fiber membrane having a diameter of about 10 inches (see page 2, line 9 of the original disclosure). Therefore, it would have been obvious for one of ordinary skill in the art to have formed a hollow fiber membrane having a diameter of about 10 inches by using a center tube having a diameter of about 10 inches as taught by Applicants' Admitted Prior Art using the process of Mancusi *et al.* ('832) in view of JP 11-169676 because, Applicants' Admitted Prior Art specifically teaches that such hollow fiber membrane are readily available

whereas Mancusi *et al.* ('832) in view of JP 11-169676 teach a hollow fiber membrane separation device (contactor), hence a similar end-product and also because Mancusi *et al.* ('832) in view of JP 11-169676 teaches an efficient and simple process for making a hollow fiber membrane.

Specifically regarding claim 27, Mancusi *et al.* ('832) specifically teach a hollow fiber membrane separation device (contactor). It is submitted that the assembly (structure) is centered in the housing (shell) in order for the resulting hollow fiber membrane separation device (contactor) to function as described.

19. Claims 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mancusi *et al.* (US Patent No. 5,186,832) in view of JP 11-169676 and in further view of Applicants' Admitted Prior Art and Bikson *et al.* (US Patent No. 4,800,019).

Mancusi *et al.* ('832) in view of JP 11-169676 and in further view of Applicants' Admitted Prior Art teach the basic claimed process as described above.

Regarding claims 22 and 23, Mancusi *et al.* ('832) in view of JP 11-169676 and in further view of Applicants' Admitted Prior Art does not teach a step of heat-treatment, specifically a first and a second heat-treatment. Bikson *et al.* ('019) teach a process for forming a hollow fiber membrane contactor including, a first step of heat-treating to cure the potting resin and then a second step of heat treatment (see col. 4, line 60 through col. 5, line 7). Therefore, it would have been obvious for one of ordinary skill in the art to have heat-treated the hollow fiber membrane contactor as taught by Bikson *et al.* ('019) in the process of Mancusi *et al.* ('832) in view of JP 11-169676 and in further view of Applicants' Admitted Prior Art because, Bikson *et al.* ('019) specifically teach that a two-step heat treatment process provides for an increased density of the

porous walls of the hollow fibers, hence providing for an improved product (see col. 3, lines 27-42) also because, all references teach similar end-products.

20. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mancusi *et al.* (US Patent No. 5,186,832) in view of JP 11-169676 and in further view of Applicants' Admitted Prior Art and Caskey *et al.* (US Patent No. 4,961,760).

Mancusi *et al.* ('832) in view of JP 11-169676 and in further view of Applicants' Admitted Prior Art teach the basic claimed process as described above.

Regarding claims 24-26, although Mancusi *et al.* ('832) teach "resinous potting materials" (see col. 9, lines 10-12), Mancusi *et al.* ('832) in view of JP 11-169676 and in further view of Applicants' Admitted Prior Art do not teach specific materials. Caskey *et al.* ('760) teach a process for making a hollow fiber membrane separation device (contactor) including, using a variety of materials as potting materials such as: epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic). Therefore, it would have been obvious for one of ordinary skill in the art to have used a variety of potting materials such as, epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) as taught by Caskey *et al.* ('760) in the process of Mancusi *et al.* ('832) in view of JP 11-169676 and in further view of Applicants' Admitted Prior Art because, Mancusi *et al.* ('832) specifically requires "resinous potting materials" (see col. 9, lines 10-12) that are equivalent alternatives such as, epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) and also because all references teach a hollow fiber membrane separation device (contactor), hence a similar end-product.

21. Claims 1-2, 4-5, 16, and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang *et al.* (US Patent No. 5,284,584) in view of Mancusi *et al.* (US Patent No. 5,186,832) and in further view of Bikson *et al.* (US Patent No. 4,800,019).

Huang *et al.* ('584) teach the basic claimed process for making a hollow fiber membrane separation device (contactor) including, providing a core, wrapping a hollow fiber fabric onto said core and potting the fabric and the core together to form an assembly (see col. 15, line 57 through col. 16, line 26). Further, Huang *et al.* ('584) teach bead-potting (see Figure 1).

Regarding claim 1, Huang *et al.* ('584) do not teach forming a cartridge. Mancusi *et al.* ('832) teach a process for making a hollow fiber membrane separation device (contactor) including, providing a core, wrapping a hollow fiber fabric onto said core, potting the fabric and the core together to form an assembly, placing the assembly in a housing (shell) and potting the assembly and the housing interior to form a cartridge (see col. 8, lines 44-48, col. 9, lines 1-7 and 60-68 and col. 9, lines 41-60). Further, it should be noted that Mancusi *et al.* ('832) specifically teach potting of the tubesheets to the interior of the housing (see col. 9, lines 22-27). Furthermore, Mancusi *et al.* ('832) teach that the potting between the fabric and the core occurs by putting down continuous resinous potting material lines (bead-potting) (see col. 10, lines 45-50). Therefore, it would have been obvious for one of ordinary skill to have inserted a hollow fiber membrane device into a casing and potted said hollow fiber membrane device to said casing as taught by Mancusi *et al.* ('832) in the process of Huang *et al.* ('584) because, Huang *et al.* ('584) specifically teach a hollow fiber membrane fabric used in separation devices, whereas Mancusi *et al.* ('832) teach a hollow fiber membrane separation devices and as such, the hollow

fiber membrane fabric of Huang *et al.* ('584) requires to be inserted into a casing and potted to said casing as taught by Mancusi *et al.* ('832) in order to function as described.

Further regarding claim 1 and in regard to claim 20, although Mancusi *et al.* ('832) teach a second potting step, Huang *et al.* ('584) in view of Mancusi *et al.* ('832) do not specifically teach mold potting. Bikson *et al.* ('019) teach a process for forming a hollow fiber membrane contactor cartridge including, providing a mold, inserting the ends of a plurality of hollow fiber (3) bundles into the mold and injecting a resinous material into the mold to form tube-sheets (1) that are integral with the housing (see col. 4, lines 48-68). Therefore, it would have been obvious for one of ordinary skill in the art to have used mold potting as an alternative to gravity or centrifugal potting as taught by Bikson *et al.* ('019) in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) because, Bikson *et al.* ('019) teach that mold potting is one of many equivalent procedures available to one ordinarily skilled in the art and also because, all references teach similar products and processes and solve the similar problem of potting in a process of making a hollow fiber membrane separation device (contactor). It is submitted that a space must exist between exterior of the fiber bundles and, the mold and the housing, in order for the resin to penetrate between said space, such that mold potting occurs as described in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019).

In regard to claim 2, Huang *et al.* ('584) teach bead-potting (see Figure 1). Mancusi *et al.* ('832) teach that the potting between the fabric and the core occurs by putting down continuous resinous potting material lines (bead-potting) (see col. 10, lines 45-50).

Specifically regarding claims 4 and 5, Bikson *et al.* ('019) teach a process for forming a hollow fiber membrane contactor including, a first step of heat-treating to cure the potting resin and then a second step of heat treatment (see col. 4, line 60 through col. 5, line 7). Therefore, it would have been obvious for one of ordinary skill in the art to have heat-treated the hollow fiber membrane contactor as taught by Bikson *et al.* ('019) in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) because, Bikson *et al.* ('019) specifically teach that a two-step heat treatment process provides for an increased density of the porous walls of the hollow fibers, hence providing for an improved product (see col. 3, lines 27-42) also because, both references teach similar end-products.

Regarding claims 16 and 18, Huang *et al.* ('584) teach a thermoplastic polyolefin as a potting material (see col. 11, lines 32-47).

In regard to claim 19, Huang *et al.* ('584) specifically teach a hollow fiber membrane fabric used in separation devices, whereas Mancusi *et al.* ('832) teaches hollow fiber membrane separation devices. It is submitted that the assembly (structure) is centered in the housing (shell) in order for the resulting hollow fiber membrane separation device (contactor) to function as described in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019).

22. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huang *et al.* (US Patent No. 5,284,584) in view of Mancusi *et al.* (US Patent No. 5,186,832) and in further view of Bikson *et al.* (US Patent No. 4,800,019) and Caskey *et al.* (US Patent No. 4,961,760).

Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) teaches the basic claimed process as described above.

Regarding claim 17, Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) do not teach an epoxy or a polyurethane potting material. Caskey *et al.* ('760) teach a process for making a hollow fiber membrane separation device (contactor) including, using a variety of equivalent materials as potting materials such as: epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic). Therefore, it would have been obvious for one of ordinary skill in the art to have used a variety of equivalent potting materials such as, epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) as taught by Caskey *et al.* ('760) in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) because, Mancusi *et al.* ('832) specifically requires "resinous potting materials" (see col. 9, lines 10-12) that are equivalent alternatives such as, epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) and also because all references teach a hollow fiber membrane separation device (contactor), hence a similar end-product.

23. Claims 21-24 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang *et al.* (US Patent No. 5,284,584) in view of Mancusi *et al.* (US Patent No. 5,186,832) and in further view of Bikson *et al.* (US Patent No. 4,800,019) and Applicants' Admitted Prior Art.

Huang *et al.* ('584) teach the basic claimed process for making a hollow fiber membrane separation device (contactor) including, providing a core, wrapping a hollow fiber fabric onto

said core and potting the fabric and the core together to form an assembly (see col. 15, line 57 through col. 16, line 26). Further, Huang *et al.* ('584) teach bead-potting (see Figure 1).

Regarding claim 21, Huang *et al.* ('584) do not teach forming a cartridge. Mancusi *et al.* ('832) teach a process for making a hollow fiber membrane separation device (contactor) including, providing a core, wrapping a hollow fiber fabric onto said core, potting the fabric and the core together to form an assembly, placing the assembly in a housing (shell) and potting the assembly and the housing interior to form a cartridge (see col. 8, lines 44-48, col. 9, lines 1-7 and 60-68 and col. 9, lines 41-60). Further, it should be noted that Mancusi *et al.* ('832) specifically teach potting of the tubesheets to the interior of the housing (see col. 9, lines 22-27). Furthermore, Mancusi *et al.* ('832) teach that the potting between the fabric and the core occurs by putting down continuous resinous potting material lines (bead-potting) (see col. 10, lines 45-50). Therefore, it would have been obvious for one of ordinary skill to have inserted a hollow fiber membrane device into a casing and potted said hollow fiber membrane device to said casing as taught by Mancusi *et al.* ('832) in the process of Huang *et al.* ('584) because, Huang *et al.* ('584) specifically teach a hollow fiber membrane fabric used in separation devices, whereas Mancusi *et al.* ('832) teach hollow fiber membrane separation devices and as such, the hollow fiber membrane fabric of Huang *et al.* ('584) requires to be inserted into a casing and potted to said casing as taught by Mancusi *et al.* ('832) in order to function as described.

Further regarding claim 21 and in regard to claim 28, although Mancusi *et al.* ('832) teach a second potting step, Huang *et al.* ('584) in view of Mancusi *et al.* ('832) do not specifically teach mold potting. Bikson *et al.* ('019) teach a process for forming a hollow fiber membrane contactor cartridge including, providing a mold, inserting the ends of a plurality of

hollow fiber (3) bundles into the mold and injecting a resinous material into the mold to form tube-sheets (1) that are integral with the housing (see col. 4, lines 48-68). Therefore, it would have been obvious for one of ordinary skill in the art to have used mold potting as an alternative to gravity or centrifugal potting as taught by Bikson *et al.* ('019) in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) because, Bikson *et al.* ('019) teach that mold potting is one of many equivalent procedures available to one ordinarily skilled in the art and also because, all references teach similar products and processes and solve the similar problem of potting in a process of making a hollow fiber membrane separation device (contactor). It is submitted that a space must exist between exterior of the fiber bundles and, the mold and the housing, in order for the resin to penetrate between said space such that mold potting occurs as described in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019).

Further regarding claim 21, Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) do not teach a hollow fiber membrane having a diameter of at least 6 inches. However, Applicants' Admitted Prior Art teaches a hollow fiber membrane having a diameter of about 10 inches (see page 2, line 9 of the original disclosure). Therefore, it would have been obvious for one of ordinary skill in the art to have formed a hollow fiber membrane having a diameter of about 10 inches by using a center tube having a diameter of about 10 inches as taught by Applicants' Admitted Prior Art using the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) because, Applicants' Admitted Prior Art specifically teaches that such hollow fiber membrane are readily

available whereas Huang *et al.* ('584), Mancusi *et al.* ('832) and Bikson *et al.* ('019) teach a hollow fiber membrane separation device (contactor), hence a similar end-product.

In regard to claims 22-23, Bikson *et al.* ('019) teach a process for forming a hollow fiber membrane contactor including, a first step of heat-treating to cure the potting resin and then a second step of heat treatment (see col. 4, line 60 through col. 5, line 7). Therefore, it would have been obvious for one of ordinary skill in the art to have heat-treated the hollow fiber membrane contactor as taught by Bikson *et al.* ('019) in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Applicants' Admitted Prior Art because, Bikson *et al.* ('019) specifically teach that a two-step heat treatment process provides for an increased density of the porous walls of the hollow fibers, hence providing for an improved product (see col. 3, lines 27-42) also because, both references teach similar end-products.

Regarding claims 24 and 26, Huang *et al.* ('584) teach a thermoplastic polyolefin as a potting material (see col. 11, lines 32-47).

In regard to claim 27, Huang *et al.* ('584) specifically teach a hollow fiber membrane fabric used in separation devices, whereas Mancusi *et al.* ('832) teaches hollow fiber membrane separation devices. It is submitted that the assembly (structure) is centered in the housing (shell) in order for the resulting hollow fiber membrane separation device (contactor) to function as described in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) and Applicants' Admitted Prior Art.

24. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huang *et al.* (US Patent No. 5,284,584) in view of Mancusi *et al.* (US Patent No. 5,186,832) and in further view of

Bikson *et al.* (US Patent No. 4,800,019), Applicants' Admitted Prior Art and Caskey *et al.* (US Patent No. 4,961,760).

Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) and Applicants' Admitted Prior Art teach the basic claimed process as described above. Regarding claim 25, Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) and Applicants' Admitted Prior Art do not teach an epoxy or a polyurethane potting material. Caskey *et al.* ('760) teach a process for making a hollow fiber membrane separation device (contactor) including, using a variety of materials as potting materials such as: epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic). Therefore, it would have been obvious for one of ordinary skill in the art to have used a variety of potting materials such as, epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) as taught by Caskey *et al.* ('760) in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) and Applicants' Admitted Prior Art because, Huang *et al.* ('584) specifically requires "resinous potting materials" that are equivalent alternatives such as, epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) and also because all references teach a hollow fiber membrane separation device (contactor), hence a similar end-product.

25. Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on May 31, 2005 prompted the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 609(B)(2)(i). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stefan Staicovici, Ph.D. whose telephone number is (571) 272-1208. The examiner can normally be reached on Monday-Friday 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael P. Colaianni, can be reached on (571) 272-1196. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Stefan Staicovici, PhD

Stefan Staicovici 7/20/05

Primary Examiner

AU 1732

July 25, 2005